9 Summary

This study investigates the impact of spatial proximity on the production of scientific knowledge in Vienna. Based on the hypothesis that local co-operation is vital to success in research and development, the R&D activities in Vienna were analysed considering the location of their facilities. Furthermore, the importance of 'local buzz' and international co-operation ('global pipelines') was taken into account.

Several data sources and methods were applied to analyse these complex issues, including the R&D survey conducted by Statistics Austria, the analysis of location-based data, as well as expert interviews. In order to place the results in a broader context, a comparison with the rest of Austria and Europe is provided. This leads to a detailed overview of the national and international importance and of the spatial characteristics of Vienna as a centre of research.

Vienna as Austria's dominant research centre

Vienna is without a doubt the prevailing hub for R&D in Austria. Apart from several universities, the number of private R&D facilities has grown significantly over the last decade. One-third of all R&D staff (33.9%) in Austria is located in the capital. Furthermore, Vienna hosts the largest universities in the country and many other publicly financed research institutions (e.g. the Austrian Academy of Sciences). It therefore has a strong public research sector, while in the rest of Austria the private sector predominates. Private R&D companies in Vienna are focusing to a large degree on research in the service sector, while in the rest of Austria the main emphasis is manufacturing.

While Vienna has recently seen a sharp increase in private R&D facilities, most funding is still concentrated within the public sector. This is particularly illustrated by the decrease in private R&D spending during the current economic crisis, whilst funds in the public sector have continued to rise. Another outcome of the strong public research sector is that research funding in Vienna is disproportionately concentrated in basic research (26.3%) and applied research (39.9%), while for the rest of Austria experimental development is the most important field of R&D activity.

With a research ratio of 3.4%, Vienna ranks second behind Styria (with 4.6%), and the past years have shown few changes. Patent statistics fail to reflect Vienna's dominance, where the city is in last place. However, this is most likely related to the emphasis of research activities in the field of humanities, rather than to a lack of ability to innovate.

Vienna in the European context

The obvious dominance of Vienna in the national context contrasts with its overall average performance on the European scale. Nevertheless, in terms of absolute R&D expenditures, Vienna is amongst the top 25 regions in Europe. Considering relative indicators (research ratio or share of employees in R&D), Vienna is in a slightly better position. The international comparison indicates again that private funding is just above average compared to the rest of Europe, while public spending plays a major role.

Spatial concentration of research activities in Vienna

The 1,363 research organisations included in this study show a high degree of concentration, particularly in the districts closest to the city centre. This spatial pattern is rooted in existing locations of established institutions (such as the universities), access to local public transport and the general infrastructure. Two research areas, anchored in both the public and private sectors, are particularly prominent in this sense: life sciences and information and communication technologies (ICT). Both exhibit a 'critical mass' and show the highest levels of concentration.

The life sciences are concentrated in four important locations: the Medical University and its surroundings in the 9th district; the Vienna Biocenter in the 3rd district; the Muthgasse in the 19th district; and the Veterinary University in the 21st district. In contrast, the ICT cluster is characterised by one single pole around the Technical University and spreads out into the 4th, 5th, 6th and 7th districts. Over time, these spatial patterns show only small changes, with some exceptions, such as the University of Economics and Business moving to its new campus. Generally speaking, the spatial concentration has become more pronounced and large research locations have gained importance.

The importance of local and international research co-operation

Research co-operation was of particularly high importance for the experts consulted during the study, although the motivations of the public sector (publications) and the private sector (marketability, innovative products) differ. However, in the life sciences fears concerning the violation of intellectual property rights do exist.

Almost all of the research bodies in Vienna engage in both local and international co-operation. Whereas regional links are more pronounced in the start-up period, as a company becomes more established, global co-operation becomes more important over time. Some rea-sons for this are the requirements for EU funding, the development of niche strategies, a strong focus on global markets or the demand for scientific expertise that is not available locally. Spatial proximity is valued, however, for its convenience and for facilitating the opportunity for informal exchange and networking. Shared infrastructure is of particular importance in the life sciences sector, as no single university or company could afford it alone.

The evaluation of Vienna as a centre of research

In general, there is a high degree of satisfaction with what Vienna has to offer research institutions. Factors related specifically to the city, such as the high standard of living, are important. In addition, the experts interviewed in the ICT sector are also satisfied with the funding schemes and the support on a regional level. This is rarely the case in the life sciences, as the required financial support is often much higher in this sector. Furthermore, the fact that there are several important life science locations in Vienna, spread throughout the city, makes it more difficult to share expensive research infrastructure, which is considered disadvantageous. An important political arena could be the policy towards location, which currently does not always accommodate the needs of the various research institutions as well as could be done.